

FCC Narrowbanding Implications

Charlottesville Transit, University Transit & JAUNT – Case Study #1

Location: Charlottesville, VA

Radio Characteristics: 3 UHF frequency pairs (2 actively used)

System: Collectively they cover the City plus 5 counties; JAUNT provides demand/response, while CTS and UTS are fixed routes

Approx. install date: 2002

Primary radio system manufacturer: Motorola

Issues to be addressed:

- Planning for replacement of radios/transmitters as they approach the end of expected life
- Improved system capacity
- Accommodate support for future narrowbanding (6.25kHz) and/or spectrum efficiency requirements

Options being considered:

➤ Alternative radio spectrum

- ❖ Public Safety/Emergency Services are currently operating a new 800MHz trunked radio system
- ❖ JAUNT is discussing viability of using spare trunk radio channels
- ❖ This would eliminate the need for narrowbanding, since the existing UHF spectrum would be phased out.

➤ Life-cycle replacement of aging transit radio system infrastructure

- ❖ Establish plan for 12.5kHz and/or 6.25kHz narrowbanding system.
- ❖ Existing radios will support 25/12.5kHz channels
- ❖ Adjust coverage requirements, where appropriate.
- ❖ Install any new/proposed transmitters, and cutover radio systems before January 2013.

➤ Partnering with DRPT and other agencies for joint procurement

- ❖ Evaluate option to purchase new radios for one or more transit agencies across VA
- ❖ Salvage the replaced radios to support other agencies in need of spare parts/radios

Bay Transit/ Bay Aging – Case Study #2

Location: Urbanna, VA

System: 5 tower sites covering approx. 3000 sq.mi. over 12 counties

50-60 paratransit vehicles (20 replacements to be in-place by August w/o radios) for demand/response only (no fixed routes)

Radio Characteristics: VHF band

Primary radio system manufacturer: Motorola

Issues to be addressed:

- Coverage improvements are needed
- Improved system capacity
- Accommodate support for future narrowbanding (6.25kHz) and/or spectrum efficiency requirements

Options being considered:

➤ Desire moving 3 towers to improve radio coverage

- ❖ Unsure whether procurement schedule can be done before January 2011 deadline
- ❖ Towers not moved this year (2010) will need to be moved/installed in conjunction with the cutover plan for switching the existing dual-band (25/12.5kHz) radios to 12.5kHz narrowband channels.
- ❖ Any new transmitters and mobile radios should consider future narrowbanding considerations (6.25kHz channels, or spectrum efficiency option)

➤ Alternate procurement method for new buses

- ❖ Typically new buses come with new radios.
- ❖ Instead, they are planning to order buses without new radios using the eVA contracts.
- ❖ Separate procurement for replacing/adding the radios and installing Dispatch Software with Stimulus funds.

➤ Discussions with County Emergency Management Coordinators

- ❖ Interest in coordination with County Emergency managers for evacuation planning and use of paratransit buses for this purpose.
- ❖ Bay Transit is discussing possibilities for alternative spectrum uses for interoperable communications with Counties (e.g. King William County for starter).

Remedial Solutions

Procurements...

- Purchase spare dual-band (25/12.5kHz) radios and support equipment prior to December 2010
- Procure a replacement system with support for narrowband frequency channels to be implemented prior to January 2013
- Consider pooling resources for Statewide procurement, and sharing spare inventory
- Consider migrating to alternate Frequency spectrum

Leased services...

- Evaluate leased services for stop-gap alternatives prior to funding system replacement.

Partnership...

- Investigate partnering with other municipal/regional radio systems that have spare capacity and are unaffected by the mandates (e.g. 800MHz trunked radio systems for public safety)

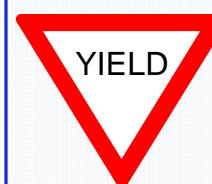
Timeframe

To phase in the migration deadline of January 1, 2013, the FCC has established interim deadlines.

The first important deadline is January 1, 2011, after which:

- The FCC will not grant applications for new voice operations or applications to expand the authorized contour of existing stations that use 25 kHz channels.
- Only narrowband authorizations will be granted.
- The FCC will prohibit manufacture or importation of new equipment that operates on 25 kHz channels. This will reduce the availability of new equipment for legacy radio systems and will affect how agencies maintain and upgrade older systems.
- If you are planning to modify your system in ways that will expand your station's interference contours, you will need to implement narrowband or equipment that meets the efficiency standard.
 - ❖ Dual-mode equipment will no longer be acceptable for newly modified operations.
 - ❖ Expansion will therefore require a full system conversion to maintain interoperability throughout the system.

By January 1, 2013, systems are required to be operating in the required Phase 1 12.5kHz Narrowband frequencies.



While an official date has not been set for implementing Phase 2's migration to 6.25kHz channels, **Users are strongly encouraged to purchase new radios that support both 12.5 and 6.25 channels.**



Additional Resources

FCC Narrowbanding Mandate http://www.fcc.gov/pshs/docs/clearinghouse/guidelines/Narrowbanding_Booklet.pdf

Interoperability (intra- or inter-jurisdictional): <http://www.safecomprogram.gov>

Yahoo Discussion Group http://tech.groups.yahoo.com/group/LMR_Narrowbanding/

FCC Part 90 VHF and UHF Materials regarding Narrowbanding <http://wirelessradio.net/>

FCC Narrowbanding Implications

What is Narrowbanding?

- Narrowband channels allow additional channels to exist in the same radio frequency (RF) spectrum
- The legacy 25kHz are being subdivided into 12.5kHz narrowband channels in Phase 1, and 6.25kHz channels in Phase 2.

Who's Impacted

Private Land-Mobile Radio (LMR) users operating below 512 MHz

The Narrowbanding Mandate applies to all Business and Industrial and Public Safety licenses in the 150-174 MHz (VHF) and 421-512 MHz (UHF) bands.

Why the change?

- These bands are highly congested, thereby limiting the expansion options for existing licensees
- Narrowband conversion will promote more efficient use of frequency spectrum, and in turn:
 - Increase capacity
 - Reduce interference potential

Affected Frequencies

- VHF: (150 – 174 MHz) Available Nationwide
- UHF:
 - (421 – 430 MHz) Available only in Detroit, Buffalo, and Cleveland
 - (450 – 470 MHz) Available Nationwide
 - (470 – 512 MHz) Shared with UHF-TV; available only in 11 cities)

Who's Not Impacted

The Narrowbanding Mandate does NOT apply to:

- ❖ Low Band (30-50 MHz) 220, 700, 800 or 900 MHz systems, nor to FRS, GMRS, MURS, Amateur, Marine VHF, or CB radio users.
- ❖ Paging-only channels are NOT subject to the narrowbanding requirements (e.g. 152.0075 MHz and 157.450 MHz in the public safety radio pool).

"Efficiency Standard" may be satisfied instead, whereby:

- Voice equipment operating over 25 kHz channels must support two or more voice channels.
- Data equipment must support a minimum of 4800 bps per each 6.25 kHz fraction of channel bandwidth (i.e. 19.2kbps for a full 25 kHz channel)

Initial Steps

- Assess inventory of affected radios
- Review near-term and long-term expansion plans
- Determine stop-gap radio equipment needs for near-term procurement(s)
- Assess alternative radio frequency spectrum
- Prepare for long-term system upgrade procurement either independently or as a regional/statewide effort

For further information, Transit Agencies may contact:



Michael Harris
michael.harris@drpt.virginia.gov

Prepared by:



Prepared for:



Virginia Department of Rail and Public Transportation